Armed Forces College of Medicine

AFCM

Hepatitis wrap up

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Hepatitis Viruses

- **Many viruses cause hepatitis**
- **Hepatitis viruses** are viruses that infect **the liver as 1ry target organ**
- **Humans are the only natural host** for hepatitis viruses

Important properties of hepatitis viruses

Virus	Family	Genome	Envelope	Modes of transmission
Hepatitis A virus (HAV)	**Picorna**virus	ssRNA	Non enveloped	**Enteric** : Fecal-oral
Hepatitis B virus (HBV)	**Hepadna**virus	**dsDNA**	Enveloped	•**Parentral** (injured skin & MM) •**From mother to child** • **Sexual**
Hepatitis C virus (HCV)	**Flavi**virus	ssRNA		

Hepatitis Viruses

Important clinical features of hepatitis viruses

Virus	Chronic carriers	Antiviral drugs useful	Vaccine Available	Igs useful
Hepatitis A virus (HAV)	No	No	**Yes**	**Yes**
Hepatitis B virus (HBV)	**Yes**	**Yes**	**Yes**	**Yes**
Hepatitis C virus (HCV)	**Yes**	**Yes**	No	No
Hepatitis D virus (HDV)	**Yes**	No	No	No
Hepatitis E virus (	No	No	No	No

Hepatitis Viruses

- Some other viruses may infect the liver as **a 2ry target organ**

Virus	Family	Disease
Epstein-Barr virus (EBV)	Herpesvirus	Infectious mononucleosis
Cytomegalo virus (CMV)	Herpesvirus	Infectious mononucleosis
Yellow fever virus (YFV)	Flavivirus	Hemorrhagic fever

Hepatitis A

- A 12-year-old teenager is brought into the emergency room with yellowish skin and abdominal discomfort. The liver function tests reveal serum transaminase levels in the 2000 IU/L range. Hepatitis A IgM was positive.
- Which of the following is the most accurate statement about probable complications?

A. Significant likelihood of hepatocellular carcinoma

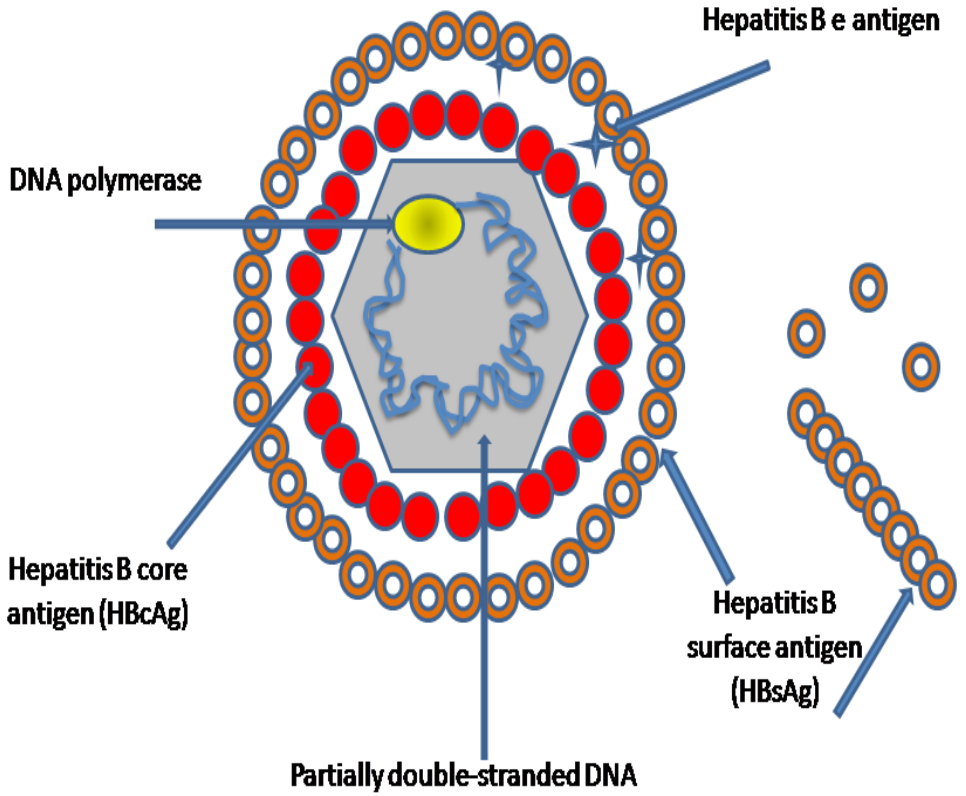
B. Almost no chance of long-term sequelae

C. About a 10 percent chance of a chronic carrier state

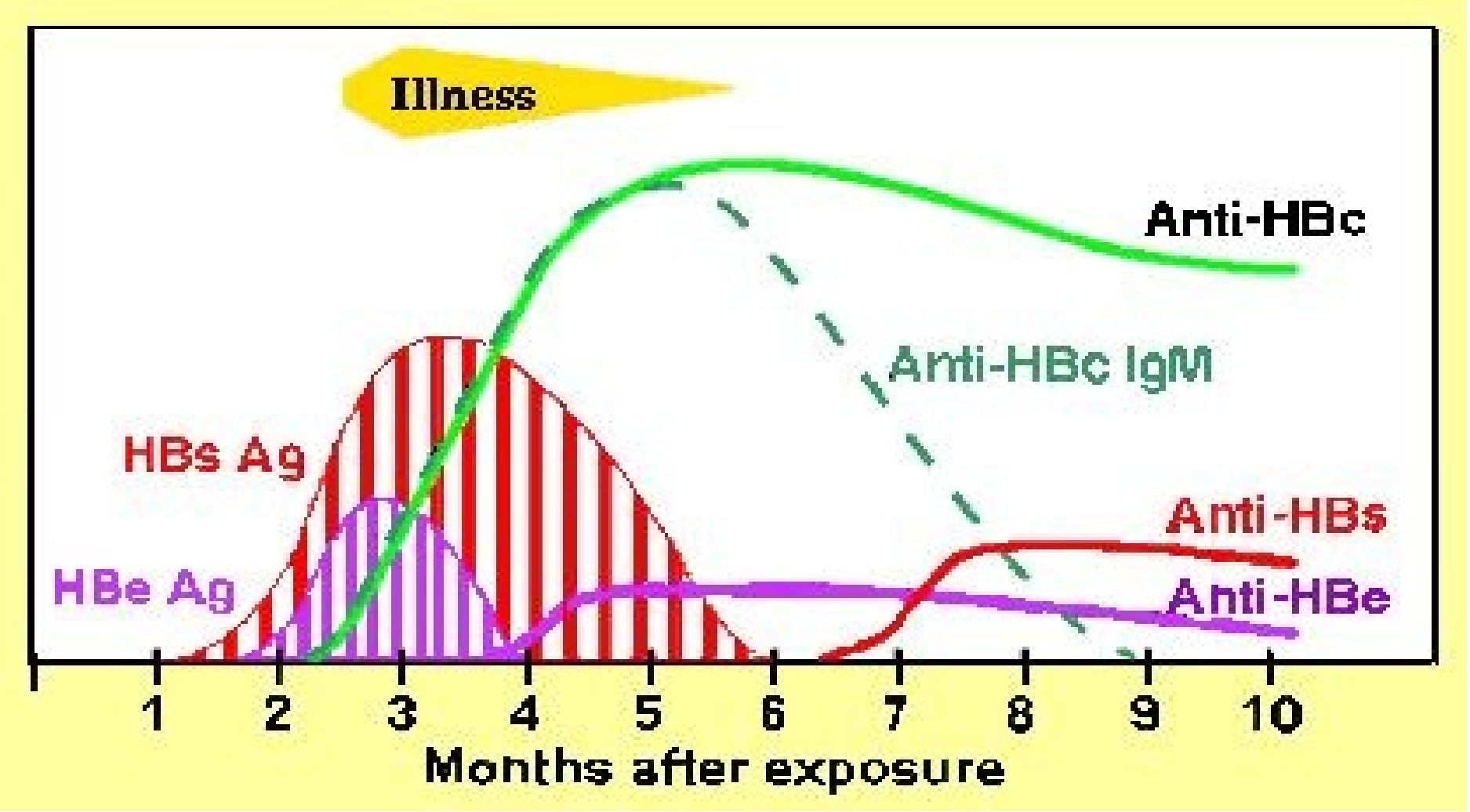
D. Long-term complications usually respond to a-interferon therapy

Hepatitis B

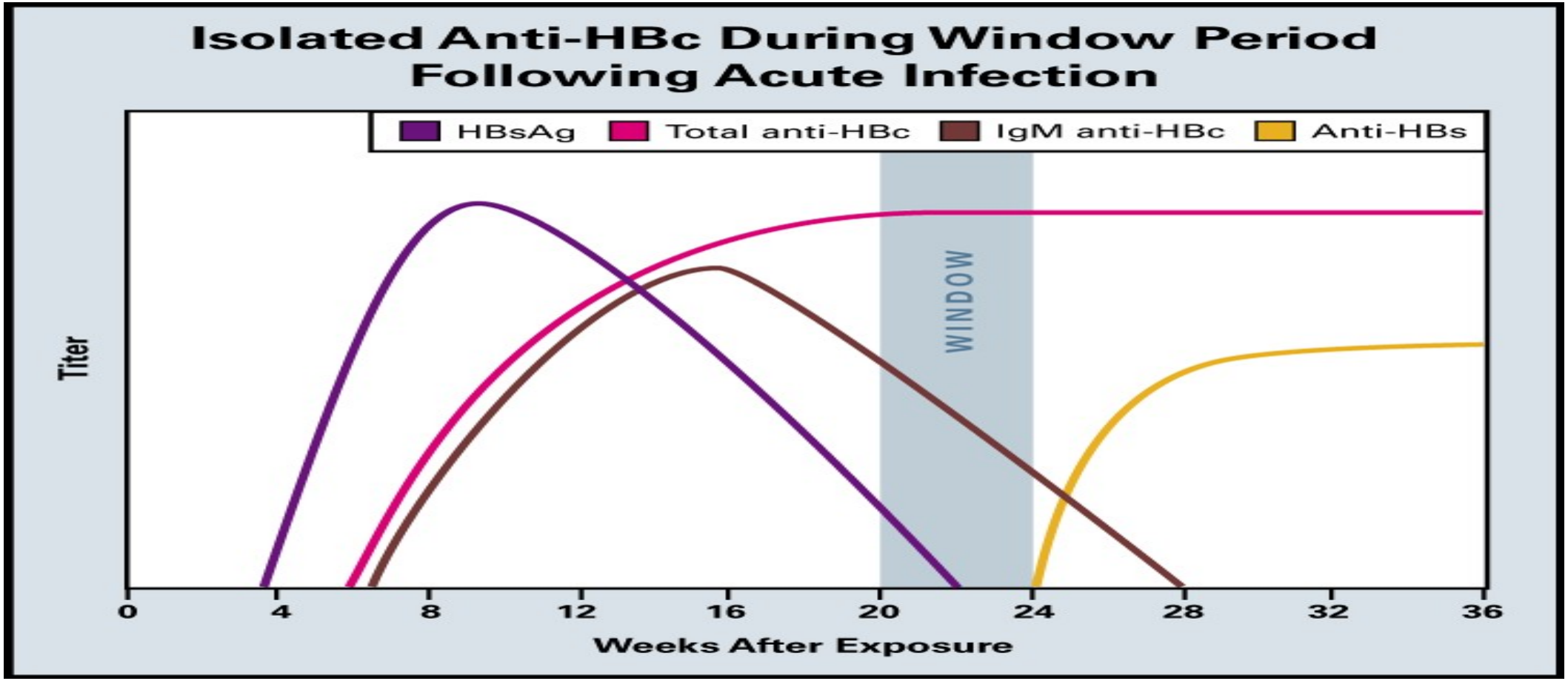
- DNA enveloped
- Parentraly transmitted
- In 10-15% may run chronic cour



Hepatitis B Laboratory diagnosis



Window Phase



Interpretations

- What does the presence of hepatitis e Ag mean?
- What does the persistence of HBsAg more than 6 months mean?
- What does the presence of HBcAb Ig M indicate?
- What does the presence of HBcAb Ig G indicate?

Interpretations

- HBsAg negative
- Anti HBcAg negative
- Anti HBsAg negative

- Susceptible individual to HBV infection

Interpretations

- HBsAg negative
- Anti HBcAg IgG positive
- Anti HBsAg positive

Immune individual to previous infection

Interpretations

- HbsAg positive
- Anti HBcAg IgM positive
- HBV DNA detection by PCR
- Anti HBsAg negative

A patient with acute infection

Interpretations

- HBsAg positive
- Anti HB core Ag IgG positive
- Anti HBcAg IgM negative
- Anti HB sAg negative

A patient with chronic hepatitis B infection

Interpretations

- HBsAg negative
- Anti HB core Ag IgM positive
- Anti HBsAg negative

- A patient with window phase

Interpretations

- HBs Ag negative
- Anti HBcAg IgG and IgM negative
- Anti HBs Ag positive

Immune individual because of vaccination against hepatitis B

Prevention

- What is the type and content of **Hepatitis B Vaccine?**
- What are the indications of **Hepatitis B immunoglobulin**?
- What are the indications of giving both Hepatitis B vaccine and Hepatitis B immunoglobulin?

Hepatitis D

- Defective virus , parentraly transmitted
- Suspected when suddenly the condition of chronic hepatitis B patient suddenly deteriorated

Diagnosis

- ELISA to detect anti-HDV IgM, Ig G
- ELISA to detect Delta antigen
- Nucleic acid detection by RT-PCR

Hepatitis D

Pathogenesis

A-Entry & Spread : as HBV

B-Effect : ↑ **severity of HBV infection**

oinfection of HDV with HBV

↑ rate of

ulminant hepatitis

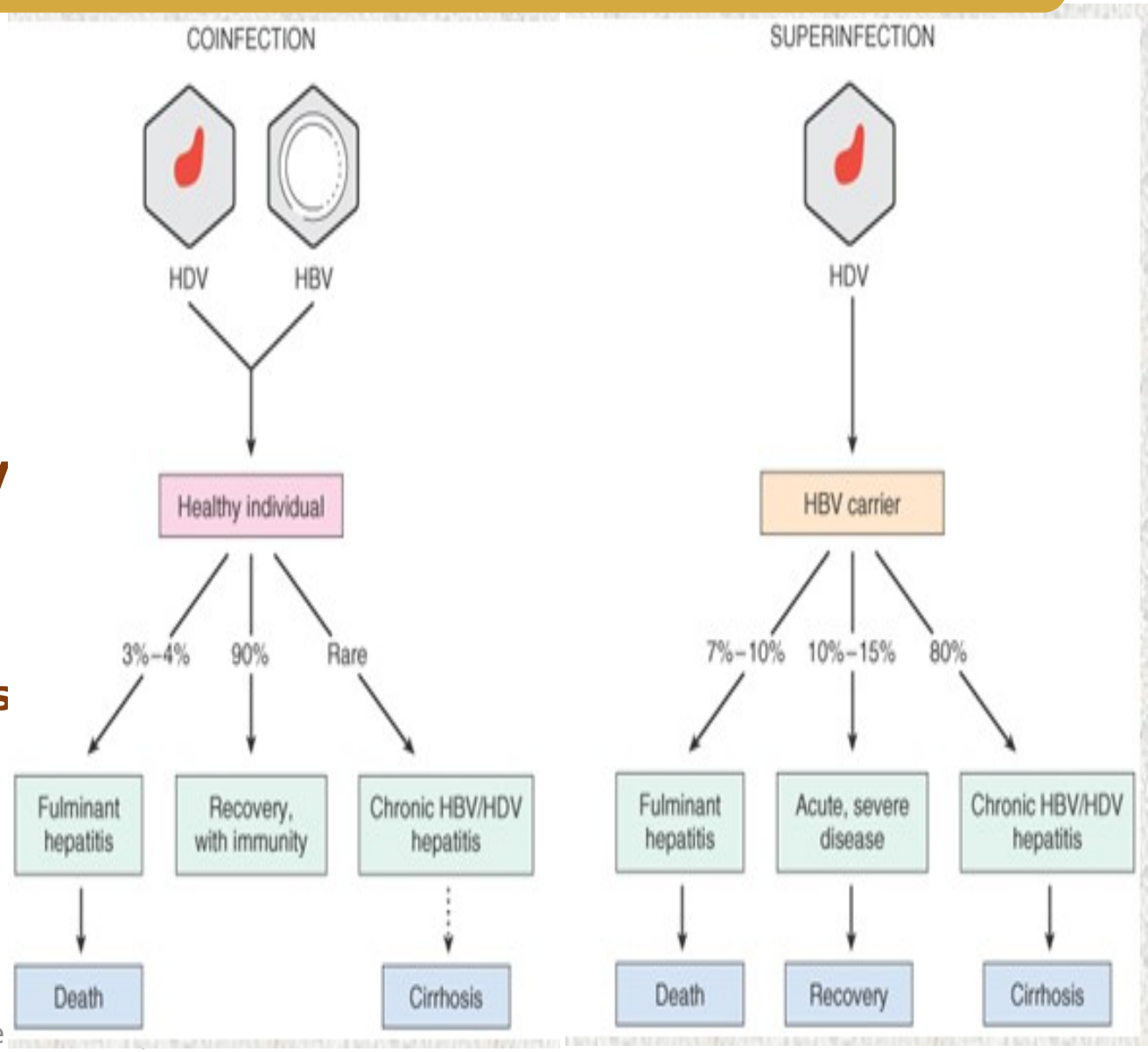
Superinfection with HDV on top of HBV

↑ rate of **fulminant hepatitis**

&

↑rate & severity of **chronic hepatitis**

↑ risk of **cirrhosis**



Hepatitis C

- RNA positive sense enveloped
- Parentraly transmitted
- There are 6 genotypes.
- **Genotype 4 is predominant in Egypt.**
- 50-75 % of cases develop chronic hepatitis.

Hepatitis C

- What is the structure of Hepatitis C

Hepatitis C Virus (HCV)

Structure

A-Nucleocapsid

1-Genome : ssRNA

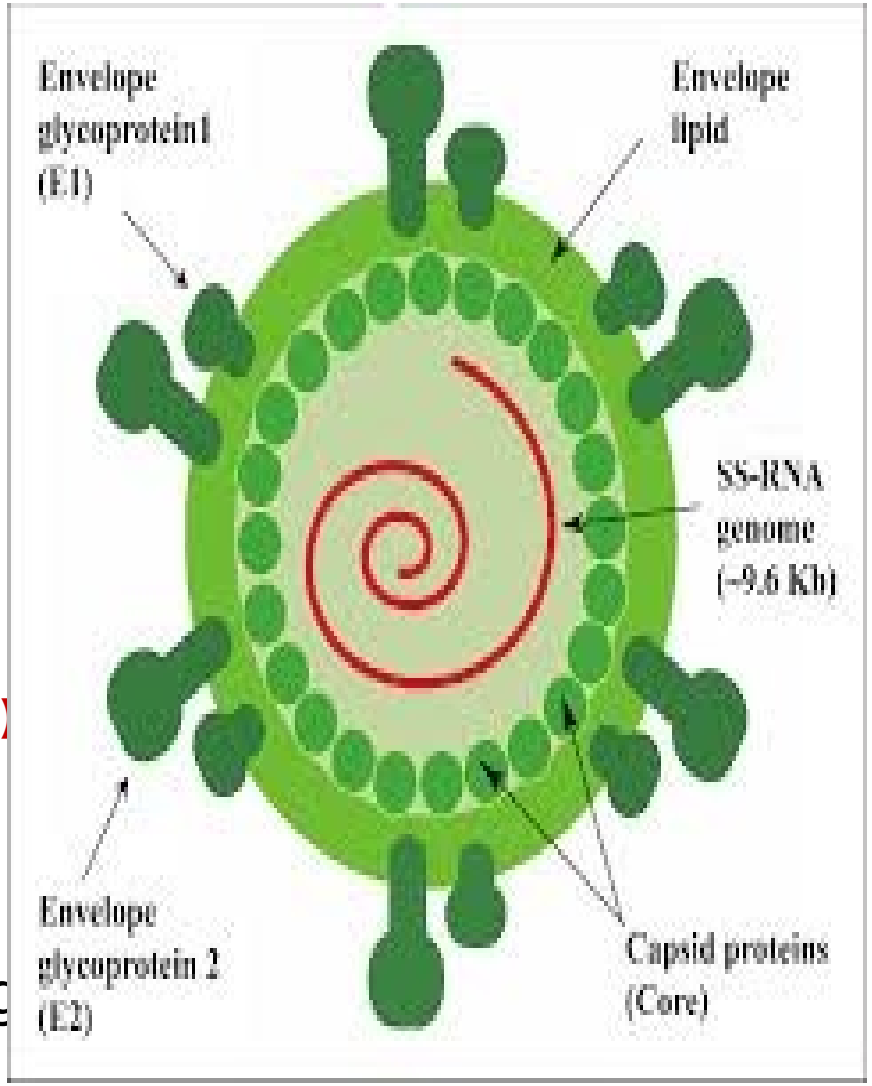
There are **6 genotypes** based on differences

in gene coding one **of the 2 envelope glycoproteins (E2)**

Genotype 4 is predominant in Egypt (followed

{Higher resistance to antiviral drugs than other g

2-Capsid (core) protein



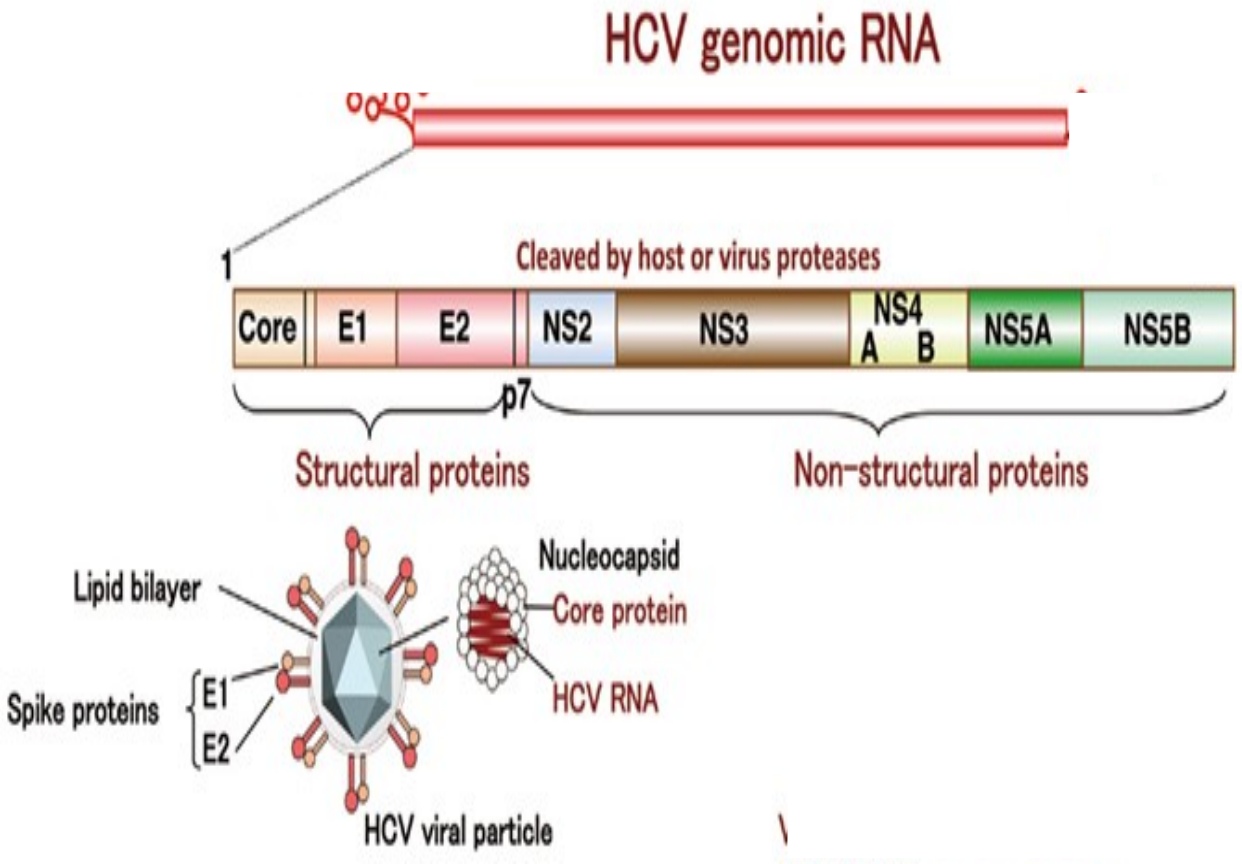
Hepatitis C

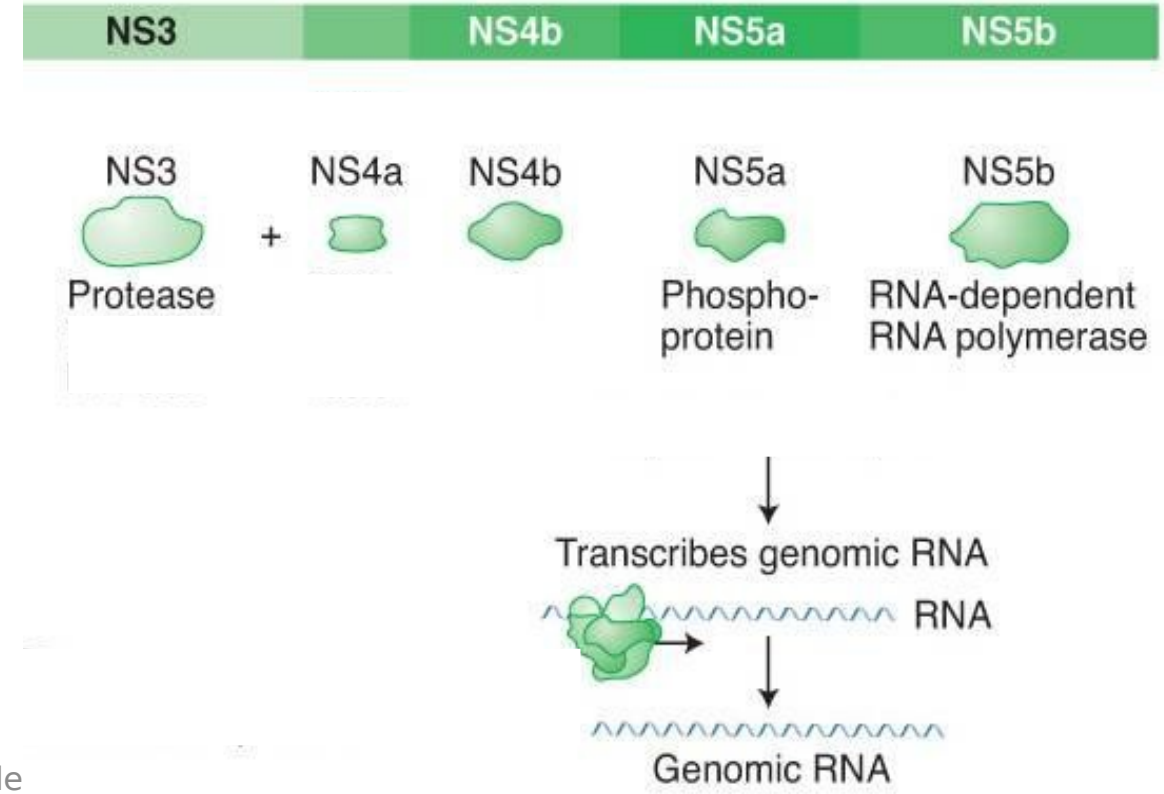
3-Enzymes involved in viral replication (Non structural proteins)

a. NS5A : Initiates transcription of RNA genome

b. NS5B : RNA polymerase viral replication

Main targets for antiHCV drugs





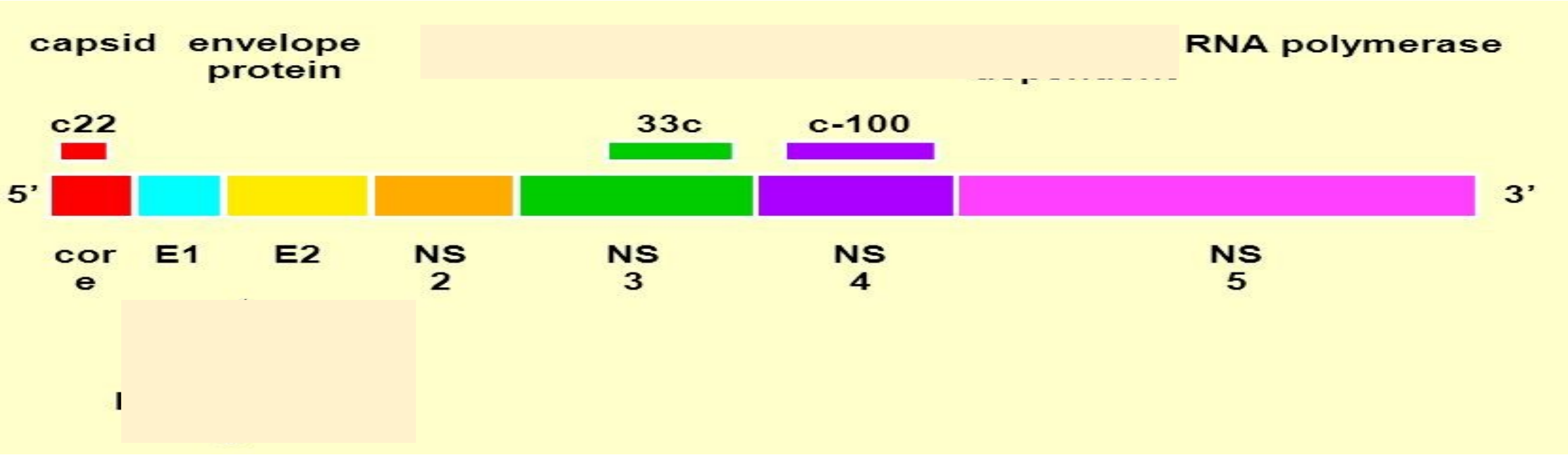
Hepatitis C

B -Envelope

Host derived lipid part carrying **2 envelope glycoproteins (E1& E2) :**

Responsible for **viral attachment** to hepatocytes

- E2 differs between the genotypes

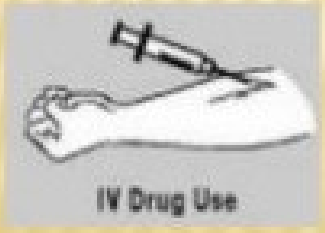


ROUTES OF TRANSMISSION

1) Vertical transmission

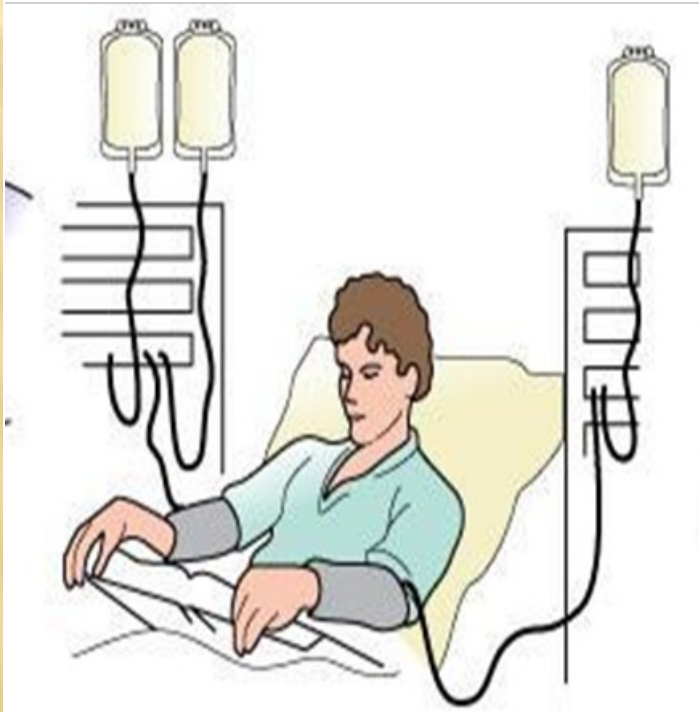
2) Sexual transmission

3) Parenteral transmission



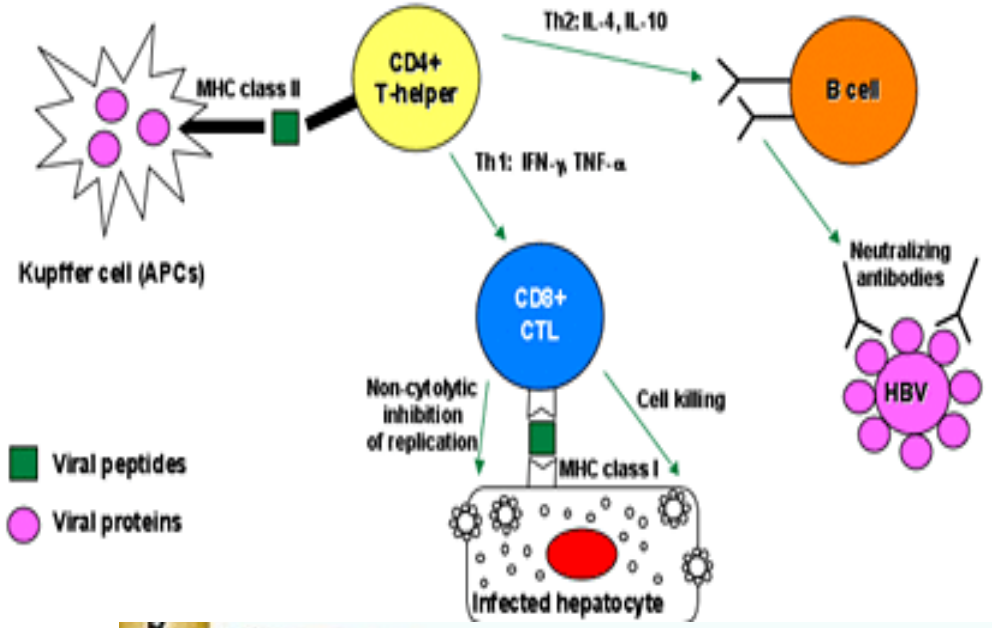
Needle stick injury

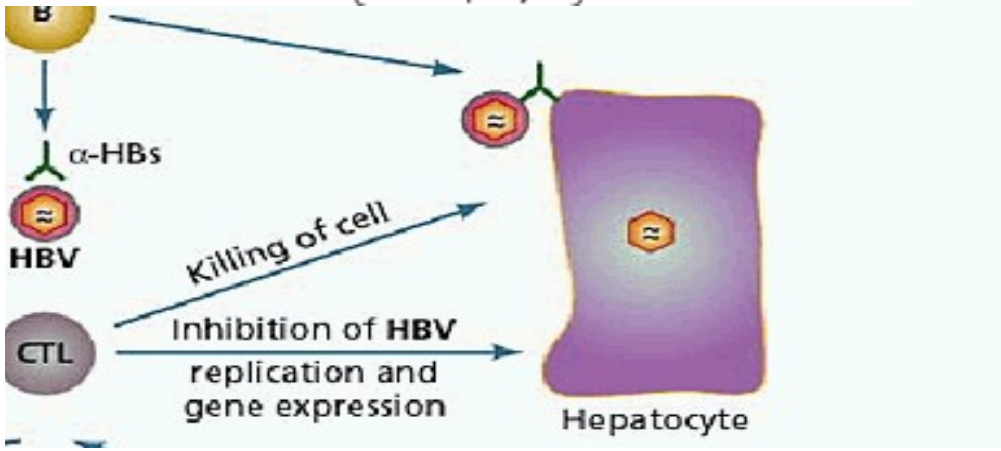
Household contacts



Contaminated dialysis equipment

- Explain pathogenesis of Hepatit





Hepatitis C

Laboratory diagnosis of HCV

I-Non specific tests : Liver functions tests

Marked ↑ in serum bilirubin & liver transaminases e.g ALT (alanine aminotransferase)

II-Specific tests

A-Detection of Abs

Rapid Ab detection test : screening test for Ab

(false +ve result may occur due to cross reacting Abs)

2nd confirmatory Ab assay

B-RT(reverse transcription)-PCR

Detection of viral RNA in blood

Hepatitis C

Scheme for diagnosis